REMARKS

This Amendment is filed in response to the Office Action mailed on March 28, 2008. All objections and rejections are respectfully traversed.

Claims 1, 3-4, and 6-8 are currently pending.

Request for Interview

The Applicant respectfully requests a telephonic interview with the Examiner after the Examiner has had an opportunity to consider this Amendment, but before the issuance of the next Office Action. The Applicant may be reached at 617-951-3067.

Claim Objections

At paragraph 3 of the Office Action, claim 1 was objected to because of informalities. Applicant has amended the claim and believes the claim is in condition for allowance.

Claim Rejections – 35 USC §112

At paragraphs 4-5 of Office Action, claims 1 and 3 were rejected under 35 U.S.C. §112, second paragraph, as being indefinite. Specifically, because claim 1 and 3 lack insufficient antecedent basis.

Applicant has amended claim 1 and 3 and believes they are allowable over the §112 rejection.

Claim Rejections – 35 USC §103

At paragraphs 6-7 of the Office Action, claims 1 and 3 were rejected under 35 U.S.C. §103 as being unpatentable over Tanizaki et al. Japan Patent No. 4-274174, hereinafter Tanizaki, in view of Strang, US Patent Application Publication No. 200/0019580, hereinafter Strang

The present invention, as set forth in representative claim 1, comprises in part:

> 1. A shutter mechanism for controlling reactants in a direct oxidation fuel cell system, having at least one fuel cell including a membrane electrode assembly, comprising:
>
> a moving component disposed within the fuel cell between a source of a reactant and the membrane electrode assembly, said ***moving component having a plurality of laterally displaced protrusions, wherein said moving component is adjustable in a direction perpendicular to the plane in which the component is disposed, such that when it is adjusted, the component travels generally in a z-axis within a vapor gap, closer to or further away from an anode current collector, to control fuel flow while not consuming substantially additional volume within the fuel cell and to allow for the fuel cell to have a smaller size for use with a mobile phone, laptop, or handheld computer***; and
>
> the anode current collector formed with a plurality of laterally displaced openings corresponding to the plurality of laterally displaced protrusions, such that when said moving component is placed adjacent to the anode current collector, the flow of said reactant is controlled, wherein said moving component is configured such that when said moving component is adjusted to a closed position, said protrusions interconnect with the openings in the anode current collector to substantially seal said openings, and ***said moving component also having apertures therein interspersed with said protrusions in such a manner that when said moving component is in an open position, said apertures allow for flow of fuel therethrough to the membrane electrode assembly***.

By way of background, Tanizaki discloses a fuel cell comprising a fuel chamber equipped with a fuel supply route for supplying fuel to and discharging fuel from a fuel oxidation electrode (anode), an air chamber, an air reduction electrode (cathode)

equipped with collector plates, and an electrolyte chamber. Adjacent to the collector plates is a laterally slidable shutter plate with a plurality of apertures formed therein. The apertures correspond directly with apertures in the collector plate so that when the shutter plate is slid laterally in one direction or the other, the shutter plate blocks fuel from entering the electrolyte chamber (i.e., the corresponding apertures no longer align) thereby controlling the fuel flow in the reaction system.

Strang discloses a tunable gas injection for use with a plasma processing system. Strang allows supersonic expansion of gases through arrays of specially designed tunable nozzles capable of adjusting the nozzle exit pressure relative to ambient chamber pressure. Furthermore, Strang enables the adjustment of the mass flow rate through a bore or cluster of bores relative to another bore or cluster of bores, wherein a plurality of bores or plurality of bores form an array of bores for gas injection. The apparatus in Strang includes a back plate with at least one through aperture formed therein. A plug plate is arranged substantially parallel to the back plate. The plug plate includes a plurality of spaced apart bores and a corresponding plurality of nozzle plugs extending from the lower surface of the plug plate. An inject plate is placed adjacent to the lower side of the plug plate and the inject plate has a plurality of through bores. The nozzle plugs on the plug plate moveably extend within respective bores on the inject plate to form a plurality of adjustable nozzle units. Strang is used for the fabrication of integrated circuits.

Applicant respectfully urges that Tanizaki and Strang taken alone or in combination do not teach or suggest Applicant's claimed novel ***moving component having a plurality of laterally displaced protrusions, wherein said moving component is adjustable***

in a direction perpendicular to the plane in which the component is disposed, such that when it is adjusted, the component travels generally in a z-axis within a vapor gap, closer to or further away from an anode current collector, to control fuel flow while not consuming substantially additional volume within the fuel cell and to allow for the fuel cell to have a smaller size for use with a mobile phone, laptop, or handheld computer and ***said moving component also having apertures therein interspersed with said protrusions in such a manner that when said moving component is in an open position, said apertures allow for flow of fuel therethrough to the membrane electrode assembly***. In further detail, Applicant's claimed invention includes a moving component within a fuel cell, where the moving component moves perpendicular (z-direction) to the plane of the moving component to control the flow of fuel in the fuel cell. The moving component has a plurality of laterally displaced protrusions and the anode current collector has a plurality of laterally displaced openings. When the moving component moves perpendicular to the plane of the moving component, i.e., along the z-axis, the plurality of laterally displaced protrusions interconnect with the laterally displaced openings on the anode current collector to prevent the flow of fuel to a membrane electrode assembly (MEA). Furthermore, the moving component has a plurality of apertures to allow fuel to flow through when not next to the anode current collector. Additionally, the moveable component does not consume substantial additional volume in the fuel cell and allows for the fuel cell to be used for powering small handheld devices such as mobile phones, laptops, PDAs, and etc.

In contrast, neither Tanizaki, nor Strang, address that the movable devices are to be used in small hand held devices. Tanizaki discloses shutters with a laterally moving/sliding shutter plate which requires an additional amount of lateral space and volume to be reserved in the fuel cell's dimensions. Strang does not disclose use with fuel cell or for powering small hand held devices.

Furthermore, Applicant argues that there is no motivation to combine Tanizaki and Strang. According to *In re Kahn,* "mere identification in the prior art of each element is insufficient to defeat the patentability of the combined subject matter as a whole. 441 F. 3d 977, 988 (CA Fed. 2006). Furthermore, it is "necessary to consider the reality of the circumstances, in other words,...would a person of ordinary skill in the art reasonably expect to look for a solution to the problem facing the inventor." *Id.* Strang merely teaches a tunable gas injection for a plasma processing system for use in fabrication of integrated circuits. Strang deals with plasma processing system and not a methanol fuel cell. Therefore, Applicant, whose skill is fuel cells, would not be motivated to look to Strang, a plasma processing system for a solution to the Applicant's problem. Therefore, it is the Applicant's position that there is no motivation to combine Strang and Tanizaki because Strang is just "mere identification in the prior art of...an element" (i.e., coherency).

Additionally, Applicant respectfully urges that Tanizaki teaches away from Applicant's claimed novel invention by teaching laterally moving/sliding shutter plates. In particular, laterally moving plates generally would not have protrusions, which would otherwise hinder the sliding action of the plates due to their corresponding relationship

with openings on a receiving plate. Tanizaki teaches away from moving a ***plurality of laterally displaced protrusions*** to match with ***corresponding openings***.

Applicant respectfully urges that the Tanizaki and Strang, taken alone or in combination, are legally insufficient to make obvious the presently claimed invention under 35 U.S.C. § 103 because of the absence of the Applicant's claimed novel ***moving component having a plurality of laterally displaced protrusions, wherein said moving component is adjustable in a direction perpendicular to the plane in which the component is disposed, such that when it is adjusted, the component travels generally in a z-axis within a vapor gap, closer to or further away from an anode current collector, to control fuel flow while not consuming substantially additional volume within the fuel cell and to allow for the fuel cell to have a smaller size for use with a mobile phone, laptop, or handheld computer*** and ***said moving component also having apertures therein interspersed with said protrusions in such a manner that when said moving component is in an open position, said apertures allow for flow of fuel therethrough to the membrane electrode assembly***.

At paragraph 8 of the Office Action, claims 4 and 6 were rejected under 35 U.S.C. §103 as being unpatentable over Tanizaki, in view of Guay, US Patent Application Publication No. 2005/0058879, hereinafter Guay, and in further view of Strang.

The present invention, as set forth in representative claim 4, comprises in part:

4. A shutter mechanism for a direct oxidation fuel cell system, comprising:
   (A) a fuel source;
   (B) a direct oxidation fuel cell, including:

(i) a protonically conductive membrane having catalyst coatings on each of its major surfaces, being an anode aspect and a cathode aspect;

(ii) an anode current collector disposed generally at said anode aspect;

(iii) a cathode current collector disposed generally at said cathode aspect;

(iv) a passive mass transport barrier disposed generally between said fuel source and said anode aspect and spaced from said anode aspect to define a vapor gap in said fuel cell, said passive mass transport barrier controlling a rate of fuel delivery to said catalyzed anode aspect of said fuel cell;

(v) ***a movable shutter plate having a plurality of laterally displaced protrusions disposed within said vapor gap between said passive mass transport barrier and said anode current collector which forms a plurality of laterally displaced openings corresponding to the plurality of laterally displaced protrusions such that said movable shutter plate is adjustable to substantially or partially prevent fuel flow through said anode current collector to the anode aspect of said fuel cell, wherein said movable plate is configured such that when said movable plate is adjusted to a closed position, said protrusions interconnect with the openings in the anode current collector to substantially seal said openings, and said movable plate also having apertures therein interspersed with said protrusions in such a manner that when said movable plate is in an open position, said apertures allow for flow of fuel therethrough, and said movable plate is adjustable in a direction perpendicular to the plane in which the plate is disposed, such that when it is adjusted, the plate travels generally in a z-axis within said vapor gap, closer to or further away from said anode current collector, to control fuel flow while not consuming substantially additional volume within said fuel cell and to allow for the fuel cell to have a smaller size for use with a mobile phone, laptop, or handheld computer***; and

(vi) a load coupled between said anode current collector and said cathode current collector for utilizing the electricity generated by the fuel cell.

Guay discloses an arrangement for a direct methanol fuel cell which includes a fuel cartridge that supplies a source of fuel to the direct methanol fuel cell. The fuel cartridge has a surface area enhanced planar vaporization membrane located within its embodiment. In addition, the arrangement may also include a fuel reservoir to receive fuel from the fuel cartridge that also has a planar vaporization membrane. These planar vaporization membranes are used during prevaporation to vaporize fuel as it moves through the membranes, rather than being vaporized in advanced of the membranes (e.g., allowing the storage of liquid in the cartridge).

Applicant respectfully urges that Tanizaki, Strang, and Guay, taken alone or in any combination, do not teach or suggest Applicant's claimed novel ***a movable shutter plate having a plurality of laterally displaced protrusions disposed within said vapor gap between said passive mass transport barrier and said anode current collector which forms a plurality of laterally displaced openings corresponding to the plurality of laterally displaced protrusions such that said movable shutter plate is adjustable to substantially or partially prevent fuel flow through said anode current collector to the anode aspect of said fuel cell, wherein said movable plate is configured such that when said movable plate is adjusted to a closed position, said protrusions interconnect with the openings in the anode current collector to substantially seal said openings, and said movable plate also having apertures therein interspersed with said protrusions in such a manner that when said movable plate is in an open position, said apertures allow for flow of fuel therethrough, and said movable plate is adjustable in a direction perpendicular to the plane in which the plate is disposed, such that when it is adjusted, the***

plate travels generally in a z-axis within said vapor gap, closer to or further away from said anode current collector, to control fuel flow while not consuming substantially additional volume within said fuel cell and to allow for the fuel cell to have a smaller size for use with a mobile phone, laptop, or handheld computer. In further detail, Applicant's claimed invention includes a moving component within a fuel cell, where the moving component moves perpendicular (z-direction) to the plane of the moving component to control the flow of fuel in the fuel cell. The moving component has a plurality of laterally displaced protrusions and the anode current collector has a plurality of laterally displaced openings. When the moving component moves perpendicular to the plane of the moving component, i.e., along the z-axis, the plurality of laterally displaced protrusions interconnect with the laterally displaced openings on the anode current collector to prevent the flow of fuel to a membrane electrode assembly (MEA). Furthermore, the moving component has a plurality of apertures to allow fuel to flow through when not next to the anode current collector. Additionally, the moveable component does not consume substantial additional volume in the fuel cell and allows for the fuel cell to be used for powering small handheld devices such as mobile phones, laptops, PDAs, and etc.

In contrast, neither Tanizaki, Strang, nor Guay, address that the movable devices are to be used in small hand held devices. Tanizaki discloses shutters with a laterally moving/sliding shutter plate which requires an additional amount of lateral space and volume to be reserved in the fuel cell's dimensions. Strang does not disclose use with fuel cell or for powering small hand held devices. Guay does not disclose using a moving element to control the flow of fuel.

Furthermore, Applicant argues that there is no motivation to combine Tanizaki, Guay, and Strang. According to *In re Kahn,* "mere identification in the prior art of each element is insufficient to defeat the patentability of the combined subject matter as a whole. 441 F. 3d 977, 988 (CA Fed. 2006). Furthermore, it is "necessary to consider the reality of the circumstances, in other words,...would a person of ordinary skill in the art reasonably expect to look for a solution to the problem facing the inventor." *Id.* Strang merely teaches a tunable gas injection for a plasma processing system for use in fabrication of integrated circuits. Strang deals with plasma processing system and not a methanol fuel cell. Therefore, Applicant, whose skill is fuel cells, would not be motivated to look to Strang, a plasma processing system for a solution to the Applicant's problem. Therefore, it is the Applicant's position that there is no motivation to combine Strang and Tanizaki because Strang is just "mere identification in the prior art of...an element" (i.e., coherency).

Additionally, Applicant respectfully urges that Tanizaki teaches away from Applicant's claimed novel invention by teaching laterally moving/sliding shutter plates. In particular, laterally moving plates generally would not have protrusions, which would otherwise hinder the sliding action of the plates due to their corresponding relationship with openings on a receiving plate. Tanizaki teaches away from moving a ***plurality of laterally displaced protrusions*** to match with ***corresponding openings***.

Applicant respectfully urges that the Tanizaki, Strang, and Guay, taken alone or in any combination, are legally insufficient to make obvious the presently claimed invention under 35 U.S.C. § 103 because of the absence of the Applicant's claimed novel ***a mov-***

able shutter plate having a plurality of laterally displaced protrusions disposed within said vapor gap between said passive mass transport barrier and said anode current collector which forms a plurality of laterally displaced openings corresponding to the plurality of laterally displaced protrusions such that said movable shutter plate is adjustable to substantially or partially prevent fuel flow through said anode current collector to the anode aspect of said fuel cell, wherein said movable plate is configured such that when said movable plate is adjusted to a closed position, said protrusions interconnect with the openings in the anode current collector to substantially seal said openings, and said movable plate also having apertures therein interspersed with said protrusions in such a manner that when said movable plate is in an open position, said apertures allow for flow of fuel therethrough, and said movable plate is adjustable in a direction perpendicular to the plane in which the plate is disposed, such that when it is adjusted, the plate travels generally in a z-axis within said vapor gap, closer to or further away from said anode current collector, to control fuel flow while not consuming substantially additional volume within said fuel cell and to allow for the fuel cell to have a smaller size for use with a mobile phone, laptop, or handheld computer.

At paragraph 9 of the Office Action, claim 7 is rejected under 35 U.S.C. §103 as being unpatentable over Tanizaki, in view of Guay, and Strang, and in further view of Fukano et al., US Patent Application Publication No. 2003/0102032, hereinafter Fukano.

At paragraph 10 of the Office Action, claim 8 is rejected under 35 U.S.C. §103 as being unpatentable over Tanizaki, in view of Guay, and Strang, and in further view of Griffin, US Patent Application Publication No. 2003/0213519, hereinafter Griffin.

Applicant respectfully notes that claims 7-8 are dependent claims that depend from independent claims believed to be in condition for allowance. Accordingly, claims 7-8 are believed to be in condition for allowance.

All independent claims are believed to be in condition for allowance.

All dependent claims are believed to be dependent from allowable independent claims, and therefore in condition for allowance.

Favorable action is respectfully solicited.

Please charge any additional fee occasioned by this paper to our Deposit Account No. 03-1237.

Respectfully submitted,

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